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Appalachian STATE UNIVERSITY BOONE, NORTH CAROLINA

# Pivoting Pedagogy: Adapting Multi-Disciplinary, Project-Based Learning To A Virtual Platform In Real Time (Poster)

By: **Chelsea Helms, D. Jason Miller, Jamie Russell, Foster Ramsey,** and **Chris Schoonover**

**Abstract**

The IDEXlab (Integrative Design Experience Laboratory), originally funded through a National Science Foundation (NSF) Transforming Undergraduate Education in STEM (TUES) grant, is a curriculum program redefining traditional pedagogical approaches by integrating academic curriculum content through an applied project in an office/ studio/lab environment. Working across disciplines; students design, build, and commission projects for community and regional partners. The program has successfully completed a farmer's market, a welcome center, an exhibit space, a teaching pavilion, a mobile classroom, and more. In the past, each of these project-based experiences has demanded in-person access to physical space for collaboration, physical technology for production, and fabrication tools for construction. In six years of operation, we have expanded and evolved the IDEXlab concept, expanding into multiple departments, rotating faculty in and out, and delivering many community partners tangible products, both through design and construction services.

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# PIVOTING PEDAGOGY

# Adapting Multi-Disciplinary, Project-based Learning to a Virtual Platform in Real Time.

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## < BACKGROUND

### WHO ARE WE?

The IDEXlab (Integrative Design Experience Laboratory), originally funded through a National Science Foundation (NSF) Transforming Undergraduate Education in STEM (TUES) grant, is a curriculum program redefining traditional pedagogical approaches by integrating academic curriculum content through an applied project in an office/studio/lab environment. Working across disciplines; students design, build, and commission projects for community and regional partners. The program has successfully completed a farmer's market, a welcome center, an exhibit space, a teaching pavilion, a mobile classroom, and more. In the past, each of these project-based experiences has demanded in-person access to physical space for collaboration, physical technology for production, and fabrication tools for construction. In six years of operation, we have expanded and evolved the IDEXlab concept, expanding into multiple departments, rotating faculty in and out, and delivering many community partners tangible products, both through design and construction services.

### WHAT WAS THE PLAN FOR SPRING 2020?

With the largest and most multidisciplinary diverse student group IDEXlab has operated with, the Spring 2020 cohort had the opportunity to work with two service-learning projects, both design outcome focused, as well as a construction based project for another university supported program. When selecting potential partners, the IDEXlab committee makes certain that the projects give students rounded experience in both design/build services and community driven impact. The following projects were chosen for Spring 2020:

1. Design for a Play-based Learning Outdoor Classroom for Cove Creek School in collaboration with the Lucy Brock Child Development Laboratory Program
2. Conservation Mobile Retreat for Metamorphic Design Consulting
3. Construction of a Demonstration Landing for The Nexus Project in collaboration with Appalachian Energy Center

## < THE INTERRUPTION

### WHY FLIP THE CURRICULUM DUE TO THE PANDEMIC?

As the concerns for COVID-19 grew in the beginning of March 2020, the faculty advisor team became aware of the implications COVID-19 might have on our project sequence, and more specifically our methods of communication. Proactively, we strategized a response to the possibility of a non-physical environment and determined that we could employ several new communication methods that might help restore the cultural and collaborative benefits of a physical design/fabrication space. Zoom would be our answer to the audio-visual connection important to a team, while Miro a virtual whiteboard, would help us facilitate the development of a solution and accountability you achieve with desk meetings and group reviews. However, even with all of the early planning of how we keep our cohort connected to fulfill our contractual obligation, the emotional impact became an increasingly critical factor in how we chose to move forward with our projects.

Without the ability to meet face-to-face, our students would not be able to fulfill the construction portion of the Demonstration Landing for The Nexus Project. In addition, the extension of Spring Break began to encroach on the time required to meet the project goals for our other two clients. However, the deciding factor that changed the trajectory of our semester was making certain that our students where empowered to support of their community in a time of crisis. To address this social responsibility, we refocused on the pandemic, giving our students opportunities to use design thinking to be part of the solution to a shared problem.

### HOW DO WE RESPOND TO COVID-19?

In multi-disciplinary teams, students began collaborating to identify opportunities and challenges resulting from the growing pandemic. Exploring project opportunities by collecting information and data through interviews, surveys, articles, and observations, student groups began to recognize the impact the virus was having on the community, the state, the nation, and the world. Awareness and empathy expanded as the students embraced the research. Narrowing in on a specific topic led to each of the 9 teams defining one focused problem statement to carry forward into synthesis and conceptual development. Teams sought to provide conceptual solutions for topics ranging from retail, to healthcare, to education, to housing, to agriculture. This need for change from the planned curriculum to a flexible real-time project, provided a chance to pilot virtual, collaborative workflow in multi-disciplinary teams, while still providing clear outcomes for reflection.

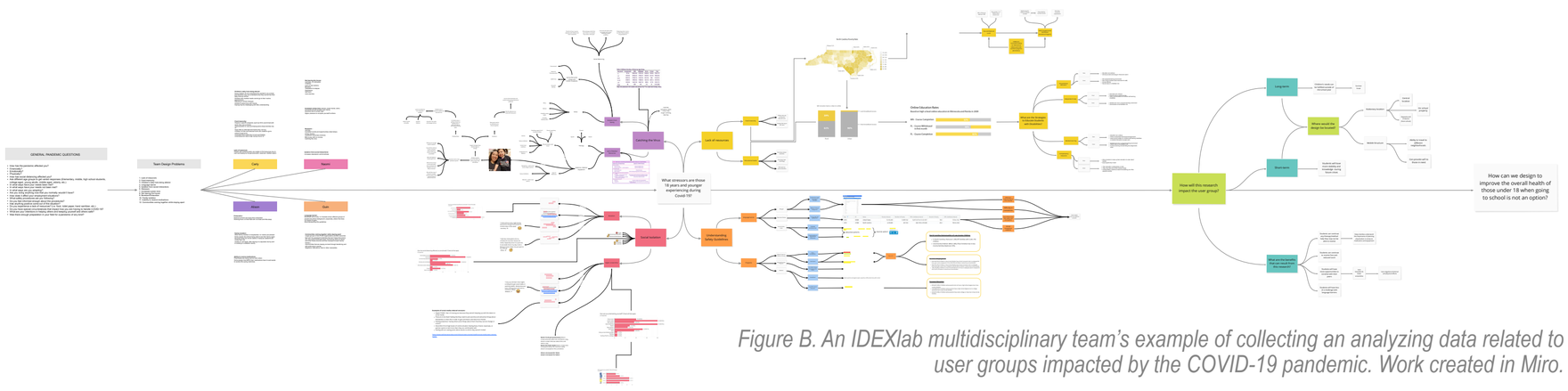

*Figure B. An IDEXlab multidisciplinary team's example of collecting an analyzing data related to user groups impacted by the COVID-19 pandemic. Work created in Miro.*

## < THE CURRICULUM FLIP

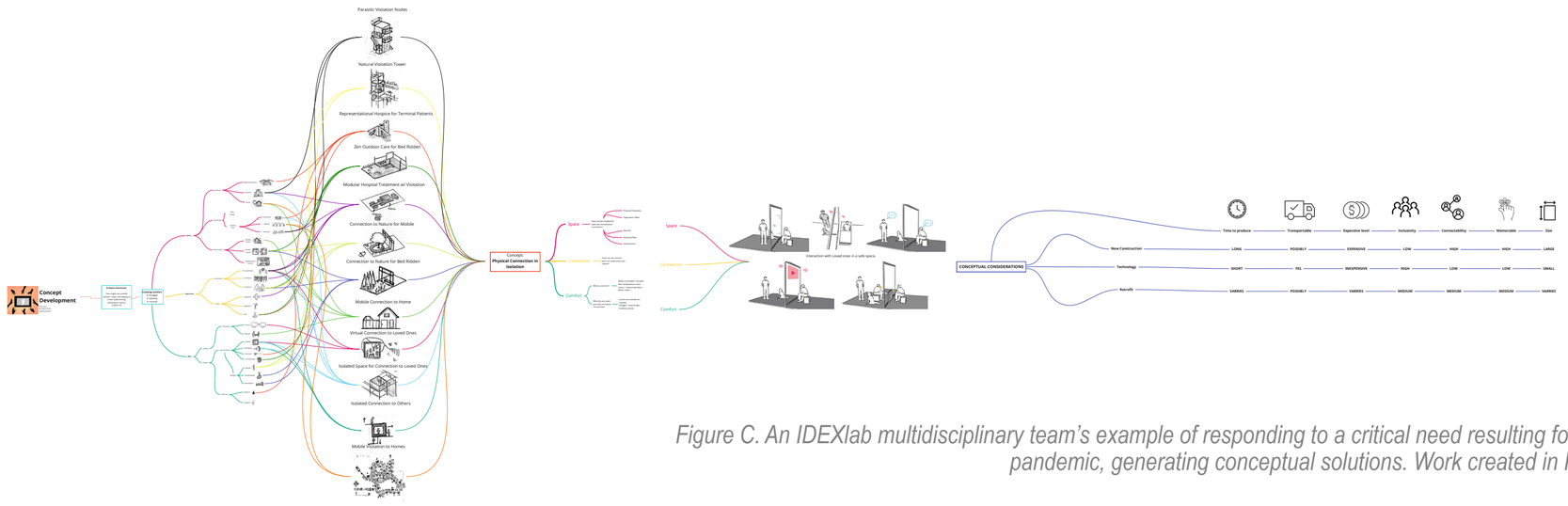

*Figure C. An IDEXlab multidisciplinary team's example of responding to a critical need resulting for the pandemic, generating conceptual solutions. Work created in Miro.*

## < THE OUTCOMES

### HOW ARE OTHER PBL AND CoP PROGRAMS PLANNING FOR THE UNKNOWN?

The literature exploring the implementation of either project based learning (PBL) or Communities of Practice (CoP) in an online format is limited. General evidence that providing teaming opportunities and advanced collaborative / mind-tools improves online student learning is provided by (Hou et al, 2020; Rapchak, 2018; Siampou et al, 2014 ). In addition, Koh et al (2010) documented that integrating PBL into asynchronous online graduate courses improved advanced levels of knowledge construction for those students, showing that PBL has the ability to bring students together around a topic even in an asynchronous format. While these authors showed that PBL can be a helpful teaching method in online courses, sources sharing how to effectively implement PBL in an online environment were lacking.

Regarding the study of the use of CoPs in online and blended learning, Smith et al (2017) provide a detailed overview of previous research studies within the online/blended learning literature focused on the use of the CoP framework. While this paper provides an excellent overview of the concept of CoP, it does not provide insight into either the effectiveness of using CoPs online or suggestions for how to implement CoPs online; rather their overview of the previous studies is used to find opportunities for future research in online teaching and learning.

## <<< THE PROACTIVE PLANNING

### HOW WILL IDEXlab PROACTIVELY PLAN FOR THE UNKNOWN?

After a semester of unavoidable reactive curriculum pivoting, a proactive plan is identified to face continuing uncertainties of academic delivery. As we lay out our options, our minds are reminded of the importance of creating a plan that allows for flexibility and adaptability. In delivery options indicated to the left, we propose two options for alternative delivery methods for the spring in the event face to face meeting will not be feasible or will be limited. These options strive to meet the IDEXlab's goals of multidisciplinary service learning and project based learning curriculum whether in person or virtually. The first option, which accounts for the least risk, identifies unique strategies for entirely remote collaboration with an external community partner, remote team collaboration, digital fabrication, and virtual construction adminsitration. The second option, provides a Hy-Flex model providing students, community partners, and faculty the opportunity to chose to collaborate face to face or remotely, creating communication channels that allow for all participants to stay involved.

Unexpectedly transitioning to remote learning became a moment of growth for both faculty and students. A time to remind us to be flexible, adaptable, and open minded in our academic experience(s). As we continue to reflect on our flipped curriculum in the spring and evolve the strategies for the unknown of PBL in higher education, we consider the unknown territory ahead as providing more opportunities to continue learning new skills, making us only more resilient as educators, as community partners, and as students.

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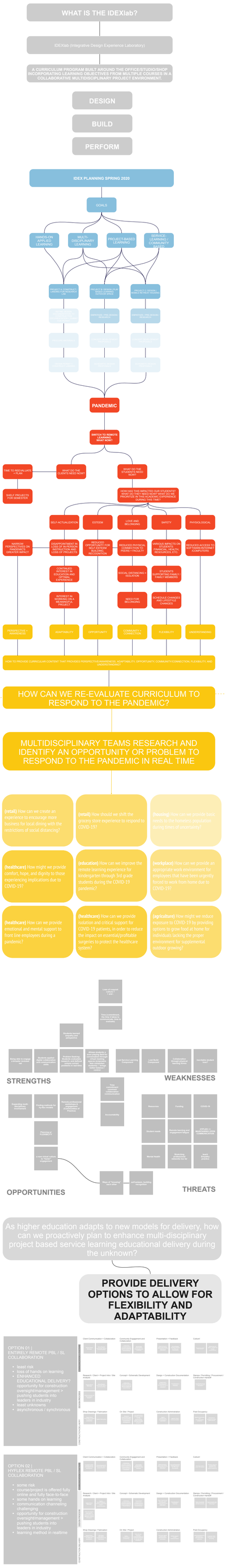


*Figure A. A virtual collaboration space, utilizing Miro - a visual collaboration platform, for faculty to breakdown the strategies of the IDEXlab curriculum. Note: This is a living and working space and provides an example of virtual collaboration.*

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